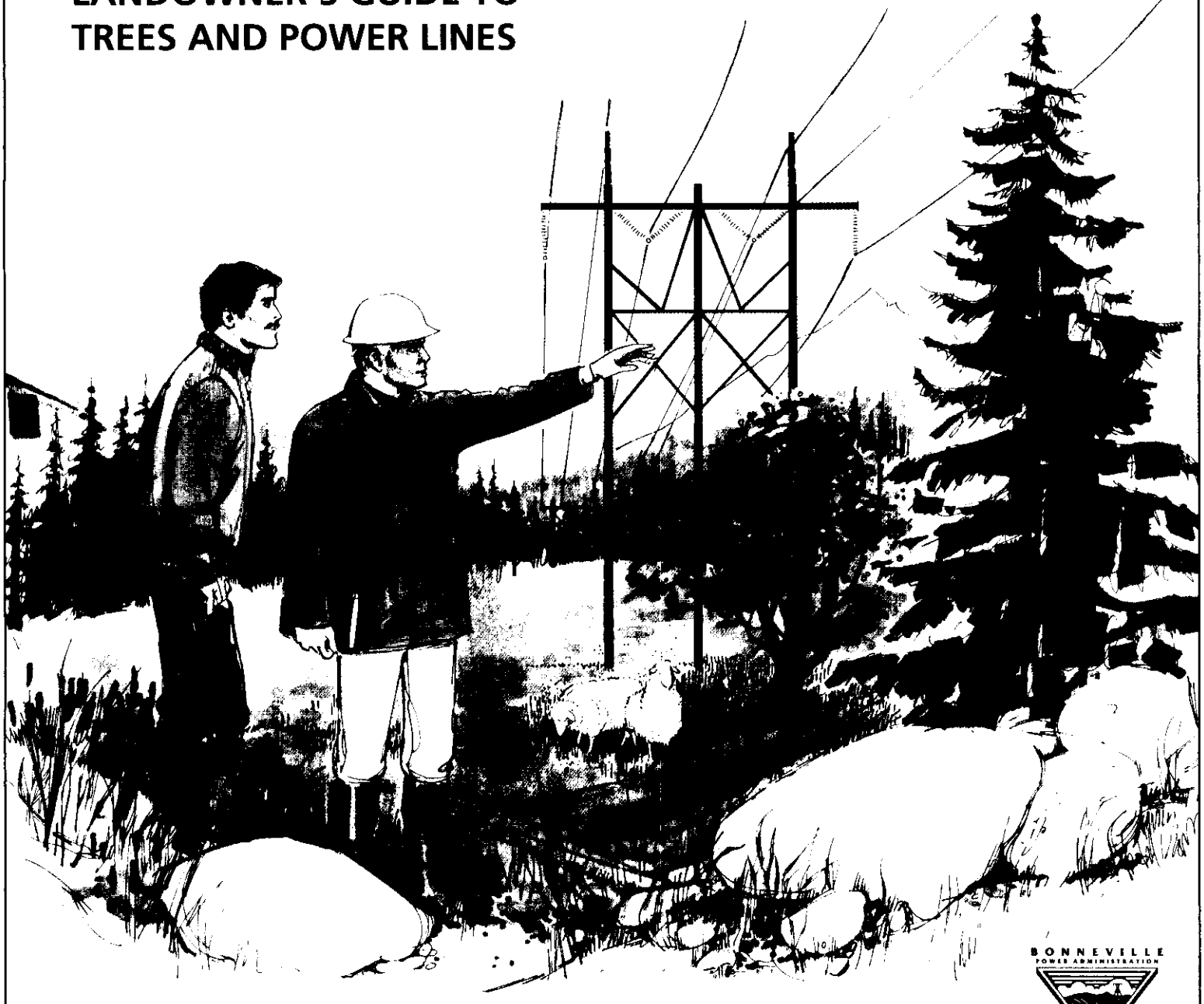
LANDOWNER'S GUIDE TO TREES AND POWER LINES



BONNEVILLE
POWER ADMINISTRATION

Throughout history, the tree has been recognized as a universal symbol of life. Truly, today, trees play an essential role in our everyday lives as they have in the past. They offer shade and privacy, buffer noise and wind, filter out dust and freshen the air. They beautify our homes and our communities. Trees bear colorful flowers, berries and fruit. They also provide cover and food for birds and other wildlife. And, in the autumn, some trees display their splendor in vibrant shades of gold, copper, and vermilion.

Nowhere in the nation are trees more abundant and varied than in the Northwest, making them one of our more valued treasures.

This brochure explains how trees and power lines can coexist. It outlines conditions under which trees are compatible with or become a danger to power lines. It also describes actions you can take to protect your plantings on or near Bonneville Power Administration (BPA) easements and rights-of-way.

INTRODUCTION

Generally, BPA builds power lines, substations, and other facilities for two reasons: to bring new power to meet the needs of the people of the Northwest, and to ensure that consumers continue to have a reliable supply of electricity. When we build these facilities, we often purchase easements (certain rights to use land) from the owner of the property we cross. These easement rights allow BPA to control vegetation on and sometimes off the right-of-way so that the facilities may be safely and reliably operated and maintained.

Trees near power lines can be beautiful and useful — but can be a hazard as well. A tree which grows too close to a power line can cause disruptions in electrical service (outages), start fires, or endanger lives. For the most part, trees are not allowed on the right-of-way. However, in special cases, BPA can allow Christmas, ornamental, and orchard trees to grow to a limited height if the landowner enters into a special written agreement called a **Tree and Brush Agreement**. Once the agreement is established, the landowner must control tree height and access. Contact your local BPA Natural Resource Specialist to find out more about the Tree and Brush Agreement. A list of BPA offices with phone numbers for the Natural Resource Specialists is found at the end of this brochure.

Dense stands of trees and/or brush growing in or near the power lines may make it hard for our men and equipment to get to the lines to maintain and repair them, making a difficult job even more hazardous to electrical workers. However, the right tree in the right place can grow compatibly near power lines. BPA would like to work together with you to meet your needs as well as our need to supply reliable electric service.

WHY CLEARANCE MUST BE MAINTAINED; HOW DANGER IS CONTROLLED

Electricity travels along high-voltage power lines well above the ground. However, electricity seeks the most direct path to ground through nearby objects. Just like lightning, electric current in power lines may seek ground through trees.

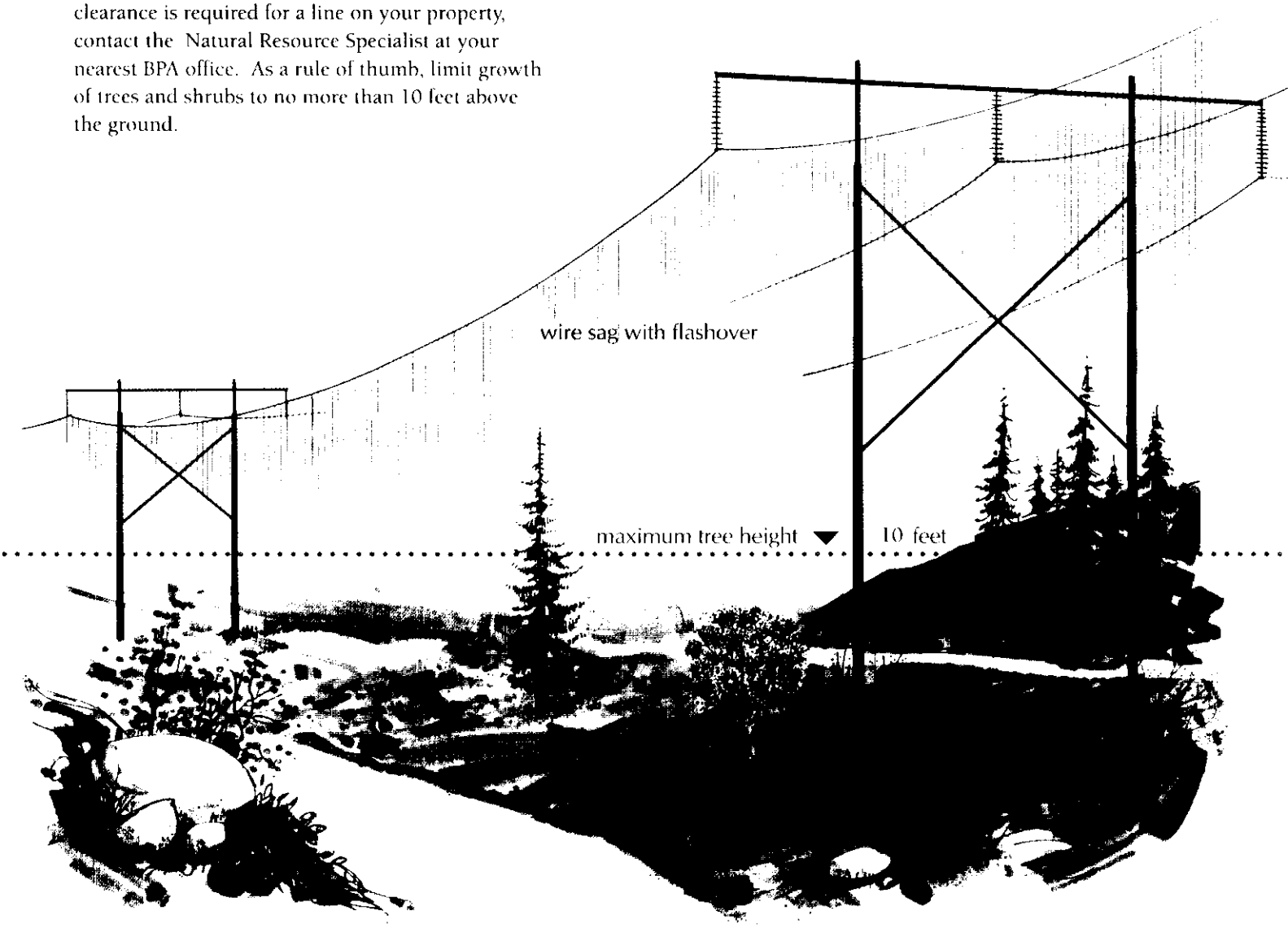
In fact, trees do not have to touch the power line to pose a danger. Electricity can "arc" from the conductor (wires strung from tower to tower) to a tree top or tree limb that is too close to the line. Thus, trees which grow too close to power lines, or which actually grow into them, can disrupt electrical service, start fires, or endanger people,animals, and property. To avoid this, BPA maintains a safe distance or clearance between trees and the power lines.

Clearance between power lines and trees must also allow for "sagging." Sagging happens when the weather is warm or the line is carrying heavy electrical loads. In other words, the conductor heats up, stretches, and sags closer to the ground. Because the amount of sagging varies with electrical load, weather, and line materials, tree clearance that is adequate in December will not automatically be adequate in July. BPA must maintain enough clearance at all times between the conductor and conductive objects that touch the ground.

Thus, to maintain safe distances between a power line and any conductive object on the ground, a minimum clearance (derived from arcing distance, sag, and how fast the tree is growing) must be maintained. Trees must not grow too high and thus too close to the power line or they will violate federally mandated clearances. Clearance must be maintained directly beneath the conductor and on either side as well. Heavy wind can blow branches into power lines, and additional weight from ice, rain, or snow can bend or break trees and limbs, bringing them into contact with the conductor.

FIGURE 1. Shows that clearance is needed between trees and power lines to prevent flashover (flashover occurs when electricity arcs or flashes through the air between the power line and another object, similar to the way lightning arcs to trees or buildings). The clearance must allow for wire sag and tree growth. BPA does not recommend that you try to calculate how close your trees can come to a power line. If you need to know how much clearance is required for a line on your property, contact the Natural Resource Specialist at your nearest BPA office. As a rule of thumb, limit growth of trees and shrubs to no more than 10 feet above the ground.

Finally, BPA must maintain access roads to reach power lines, structures (towers, wood poles, microwave sites), and substations which comprise the BPA electrical system. These roads must be kept clear of vegetation and other obstructions to allow maintenance workers to reach the sites to perform the routine and emergency maintenance which keeps the electrical system operating.



SAFE LOGGING PRACTICES SAVES LIVES

Every year people suffer serious injuries in the Northwest due to unsafe logging practices around power lines. These injuries or loss of life can be avoided by paying attention and playing it safe.

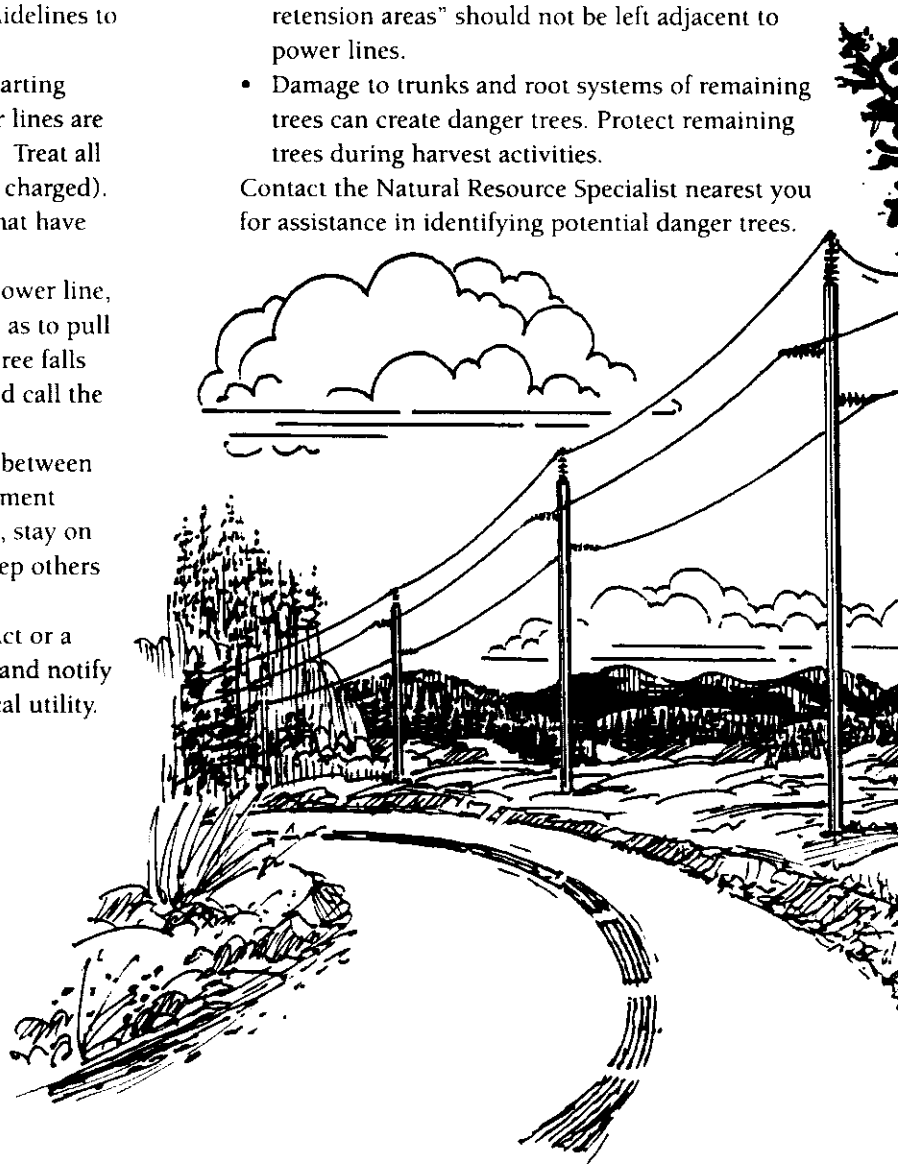
A tree falling through or near a power line can be a hazard to people and their equipment. For that reason, we suggest the following guidelines to make this operation the safest possible.

- Always look for power lines before starting harvest operations. Whenever power lines are present, contact the local utility first. Treat all power lines as energized (electrically charged).
- Never climb or attempt to fall trees that have limbs caught in power lines.
- If a tree has the potential to reach a power line, a line should be placed on the tree so as to pull it as it falls away from the line. If a tree falls into a power line, stop! Stay clear and call the local utility.
- Maintain at least 20 feet of clearance between equipment and power lines. If equipment comes into contact with a power line, stay on the equipment until help arrives. Keep others away.
- If a fire starts from an electrical contact or a downed power line, contain the fire, and notify the fire protection agency and the local utility.

SAFE LOGGING PRACTICES PREVENTS DANGER TREES

- Trees left adjacent to the right-of-way after logging may create fringes that can be hazardous to power lines. They may be unstable and can fall during windstorms causing power outages and starting wild fires.
- State required "leave trees" or "green tree retension areas" should not be left adjacent to power lines.
- Damage to trunks and root systems of remaining trees can create danger trees. Protect remaining trees during harvest activities.

Contact the Natural Resource Specialist nearest you for assistance in identifying potential danger trees.



WHAT YOU CAN DO

As a property owner, you can help BPA ensure against electrical outages and at the same time protect yourself and prevent damage to your property. We suggest the following:

DON'T PLANT TREES ON THE RIGHT-OF-WAY without first talking to your local BPA Natural Resource Specialist.

SELECT PLANTINGS CAREFULLY.

When thinking about trees or shrubs to plant, find out how tall and wide the full-grown plant will be. Generally, small trees and shrubs with a mature height of 10 feet or less will not cause problems within the right-of-way unless they are planted on an access road or too close to towers or poles. Trees planted adjacent to the right-of-way should not exceed 20 feet in height when fully grown. Ask about its growth pattern, maintenance needs, and the strength of its wood. Strong, flexible (not brittle) wood, resistance to disease and insects, and deep-rooted (rather than shallow-rooted) growing patterns are also important characteristics. We also recommend trees or shrubs adapted to the climate of the Northwest and that are able to withstand local storm conditions (wind, snow or ice loading, rain-soaked soils, and so on). Consult your local nursery to help you select suitable plantings.

PLANT TREES AND SHRUBS TO MINIMIZE OBSTRUCTION OF ELECTRICAL FACILITIES OR OF ACCESS TO THEM.

As a general rule of thumb, it is best not to plant trees or shrubs on the right-of-way. However, if you need or want plantings in this area, consult first with your local BPA Natural Resource Specialist. You may not plant trees or shrubs within 30 feet of towers, poles, or other groundbased structures, or in any place that would block off or overgrow access roads. Many BPA transmission structures have wires attached to them that are buried. These wires are part of the grounding system. They can extend up to 250 feet from the structures and are usually buried one to two feet deep. If you contact these wires while planting or digging, please do not damage, cut, or relocate them and immediately contact your local Natural Resource Specialist.

DO NOT PLANT POPLARS ADJACENT TO THE RIGHT-OF-WAY.

Very tall, brittle trees such as poplars are often planted as windbreaks. These should not be planted anywhere near the right-of-way because they are fast growing and have weak, brittle wood. They increase the hazard to power lines and the potential for property damage and fires.

PLANT COMMERCIAL PLANTINGS PARALLEL TO THE POWER LINE.

Commercial plantings, such as Christmas trees or orchards are acceptable with a signed and approved Tree and Brush Agreement. They should be planted parallel to the power line. They should not cut across the right-of-way or they could be damaged if long spans of conductor should need to be lowered to the ground for repair or maintenance. Remember, commercial plantings such as Christmas trees and orchards require permits. These permits require that the permitee maintain trees at specific heights and distances from BPA facilities and access roads.

MAINTAIN PLANTINGS PROPERLY.

Proper maintenance will increase the health and life span of plantings. It may also reduce hazards to the power line. You can examine trees and shrubs for signs of insects and disease. Be careful when pruning or trimming. But above all, remember to maintain at least 20 feet of clearance between the conductors and any conductive objects. Don't let tree limbs, equipment or people violate that safety clearance.

REMEMBER:

- **The trimming of trees around power lines is extremely dangerous and can cause loss of life and property.**

- **Always keep a safe working distance from power lines.**

- **If a tree has already grown within or even close to a critical distance from the Line, DO NOT CUT THE TREE YOURSELF. Instead, contact the nearest BPA Natural Resource Specialist, and BPA will advise you or even cut the tree down for you.** If you choose to trim or cut the trees around a power line, BPA highly recommends that you hire a professional tree trimmer who has qualifications to work near electrified lines.

MORE INFORMATION

If you'd like to know more about trees and power lines, here is a list of publications and other information sources that are available.

The Yellow Pages of your phone book may provide additional resources. Check under the following headings: Arborists, Landscape Architects, Landscape Contractors, Nurseries and Tree Services.

PUBLICATIONS

The following publications may be useful:
Maintenance of Shade and Ornamental Trees, P.P. Pirone. Oxford University Press.

Pruning How-To-Guide for Gardeners, Robert L. Stebins and Michael MacCaskey. Fisher Publishing Co.

How to Detect and Correct Hazard Trees Near Your Home, Lynn Mills and Kenelm Russell. Washington Department of Natural Resources, Olympia, WA 98504. Free

Publications Catalogue, Bulletin Department, Cooperative Extension. Cooper Publications Bldg., Washington State University, Pullman, WA 99164. Lists many free or low-cost publications.

Publications, Bulletin Mailing Office, Industrial Building, Oregon State University, Corvallis, OR 97331. Lists many free or low-cast publications.

BPA PUBLICATIONS

Living and Working Safely Around High-Voltage Power Lines

Landowner's Guide to BPA Projects: Before and During Construction

Landowner's Guide to Use of BPA Rights-Of-Way

Keeping The Way Clear For Better Service: Danger Tree Program

What We Know (And Don't Know) About EMF or Electric Power Lines: Questions and Answers on Research into Health Effects

These publications are available by calling your local BPA office or by writing to:

Bonneville Power Administration
Public Information Center
P.O. Box 3621
Portland, OR 97208

Bonneville Power Administration

PO Box 3621 Portland, Oregon 97208-3621

DOE/BP-3076 AUGUST 1998 3.5M